

19 Japanese Patent Office  
11 Patent Application Publication S64-897  
12 Public Notice of Patent Publication  
43 Publication Date: January 5, 1989  
54 Name of Invention: Speaker  
21 Patent Application: S62-155851  
22 Date of Application: June 23, 1987  
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### Details

1. Name of Invention

Speaker

2. Scope of the Patent Claim

A speaker which has the two belts of gold threads on the damper; one end of the belts is connected to the lead line running from its voice coil, and the other end of the belts is connected with its terminal. The several lines of gold threads are woven in continuity into a cotton belt. The gold thread belts are soaked in resin. Two such gold thread belts are placed on the damper in parallel keeping certain distance from each other. A circle-shaped hole with the same diameter with the diameter of the voice coil bobbin is made in the center of the damper. When the hole is made, the gold thread belts are cut so as that the inner end of the belts protrude into the hole by a pre-determined length and the protruding portions of the belts are bent at right angles at the periphery of the hole. The voice coil bobbin is placed into the center hole of the damper.

3. Detailed Explanation of the Invention Industrial Application Area

This invention is applied to speakers for various kinds of audio system.

### Existing Technology

Traditional speakers have more or less a structure similar to the one shown in Illustration No.

4. A magnetic field (5) is formed by putting a ring-shaped magnet and a ring-shaped top plate (4) on a bottom plate (2) which has a center pole (1). A frame (6) is attached to the top plate (4) of the magnetic field(s). A gasket (7) and a diaphragm (8) are attached to the outer edge of the frame (6).

A voice coil (10), which is placed as shown in Illustration No. 4 with no eccentricity toward the magnetic gap (9) created by the magnetic circuit of the magnetic field (5), is placed in and connected to the center of diaphragm (8). A damper (11) supports the voice coil (10) at

the middle of its bobbin. A dust cap (12) is placed on the top center of the diaphragm (8). In this kind of traditional type speaker, the lead line (13) coming from the voice coil (10) is connected and fixed to the gold threads (14) on the side wall of the bobbin, and the gold threads are placed in the space between the diaphragm (8) and the damper (11) and are connected with a terminal (15).

#### The Problems to Be Solved by this Invention

The traditional speaker with the structure described above may originate abnormal noise, especially if it is a thin-type speaker. When the speaker is on motion, the gold threads (14) which are connected with the voice coil bobbin on one end in appropriate slackening condition, vibrate irregularly due to the up-down movement of voice coil (10) and touch the diaphragm (8) or the damper (11), and produce such noise. In addition, these gold threads (14) can be snapped at the terminal (15) or at the connection point on the side wall of voice coil bobbin by the irregular vibrations of the threads described above.

This invention is intended to provide a speaker which is free from the above-mentioned problems. Namely such speaker will not need any adjustment of its gold thread's slackening condition, and the gold threads in such speaker it will not touch other parts of it irrespective of the distance between the diaphragm (8) and the damper (11), and therefore, such speaker will not originate abnormal noise and the gold threads in it will not be snapped at the connecting points.

#### Means to Solve the Problems

To solve the problems, this invention has the following features. Several lines of gold threads which have cotton yarn or synthetic fiber as its core material are woven into a cotton cloth vertically (or horizontally) in continuous way. The cotton cloth has two parallel gold thread belts woven into it with an appropriate distance from each other. The cotton cloth is transformed into a damper. The one end of gold thread belts is connected to a lead line, which comes from the voice coil, at the sidewall of the voice coil bobbin. The other end of the gold thread belts, which is directed toward the periphery of the damper, is connected with a terminal.

#### Effect

There is no need to adjust the slackening condition of the gold thread belts because the belts were woven into and wired in the damper cotton cloth. There is no concern about abnormal noise because the gold threads will not vibrate independently and thus they will not touch other components of the speaker, such as the diaphragm.

Further, the snapping of the gold threads at the terminal or at the connection point on the sidewall of the voice coil bobbin can be avoided because there is no bending stress on the connection points caused by the independent vibrations of the gold threads.

### Sample

The following is the explanation of a sample speaker which utilizes this invention. As shown in Illustration No. 1, a magnet field (19) is formed by putting a ring-shaped magnet (17) and a ring-shaped top plate (18) on a bottom plate (16) which has a center pole. This magnet field (19) and a terminal (20) are integrated and molded together when a frame (21) is formed with resin. A gasket (22) and a diaphragm (23) are attached to the periphery of this frame (21). A voice coil (25) is placed in and connected to the center of the diaphragm (23) with no eccentricity toward the magnetic gap (24) which is formed by the magnetic circuit of the magnetic field (19).

A damper (27) supports the voice coil (25) at the middle of the bobbin. As shown in Illustration No. 2, several lines of gold threads, which have cotton yarn or synthetic fiber as its core material, are woven into a cotton cloth vertically (or horizontally) in continuous way, and the cotton cloth has two parallel gold thread belts woven into it keeping an appropriate distance from each other, and the cotton cloth is soaked in resin, and the soaked cloth is transformed into the damper (27), which has several corrugations of concentric circle shape, the center of which is located in the middle of the two belts of gold threads (26).

A circle-shaped hole with the same diameter of the voice coil bobbin is made in the center of the damper (27). When the hole is made, the gold thread belts are cut as such that the inner end of the belts protrude into the hole by a pre-determined length and the protruding portions are bent at right angles at the periphery of the hole. The voice coil bobbin is placed into and connected to the hole which are made through the steps described above. As shown in Illustration No. 1, a lead line which comes from the voice coil (25) is connected to the bent portion of the gold thread belt in the center of the damper at the sidewall of the bobbin. The outer edge of the gold thread belts (29) shown in Illustration No. 2, which shows the damper (27), is connected to the terminal (26) shown in Illustration No. 1. Further, the diaphragm (23) has a dust cap (30) attached in the center of its top surface.

### Effect of the Invention

As explained above, this invention has the following effects.

There is no need to adjust the slackening condition of the gold thread belts in the process of making the speaker because the gold threads are woven into the damper which is made of cotton cloth, and then the damper is corrugated in concentric circle shape, and both ends of the gold thread belts protrude over the inner and outer edges of the damper respectively and

the protruded portions are connected respectively to the lead line which comes from the voice coil and to the terminal which are insulated by a resin frame.

This speaker does not produce abnormal noise because there would be no contact between the gold threads and other components of the speaker, such as diaphragm or damper. This can be accomplished by having the gold threads be woven into the damper so as not to allow the gold threads to vibrate independently.

The snapping of the gold threads at the connection point with the voice coil lead or at the connection point with the terminal can be avoided because there is no bending stress on such connection points caused by the independent vibration- of the gold threads.

As a result, reliability of the wiring from the terminal to the voice coil is extremely improved. Also the assembly works are streamlined.

#### 4. Brief Explanation of Illustrations

Illustration No. 1 shows a section of a speaker which utilizes this invention. Illustration No. 2 shows an enlarged illustration of the damper in the speaker.

Illustration No. 3 shows an enlarged illustration of the damper which is explained in paragraph 2. (The Scope of the Patent Claim).

Illustration No. 4 shows a section of a traditional speaker.

- 16 bottom plate
- 17 ring-shaped magnet
- 18 top plate
- 19 magnet field
- 20 terminal
- 21 resin frame
- 22 gasket
- 23 diaphragm
- 24 magnetic gap
- 25 voice coil
- 26 gold thread belt
- 27 damper
- 28 gold thread belt which protrude over the inner periphery of the damper
- 29 gold thread belt which protrude over the outer periphery of the damper
- 30 dust cap